The animal husbandry perspective: Managing animals and their excreta in low- and middle-income countries

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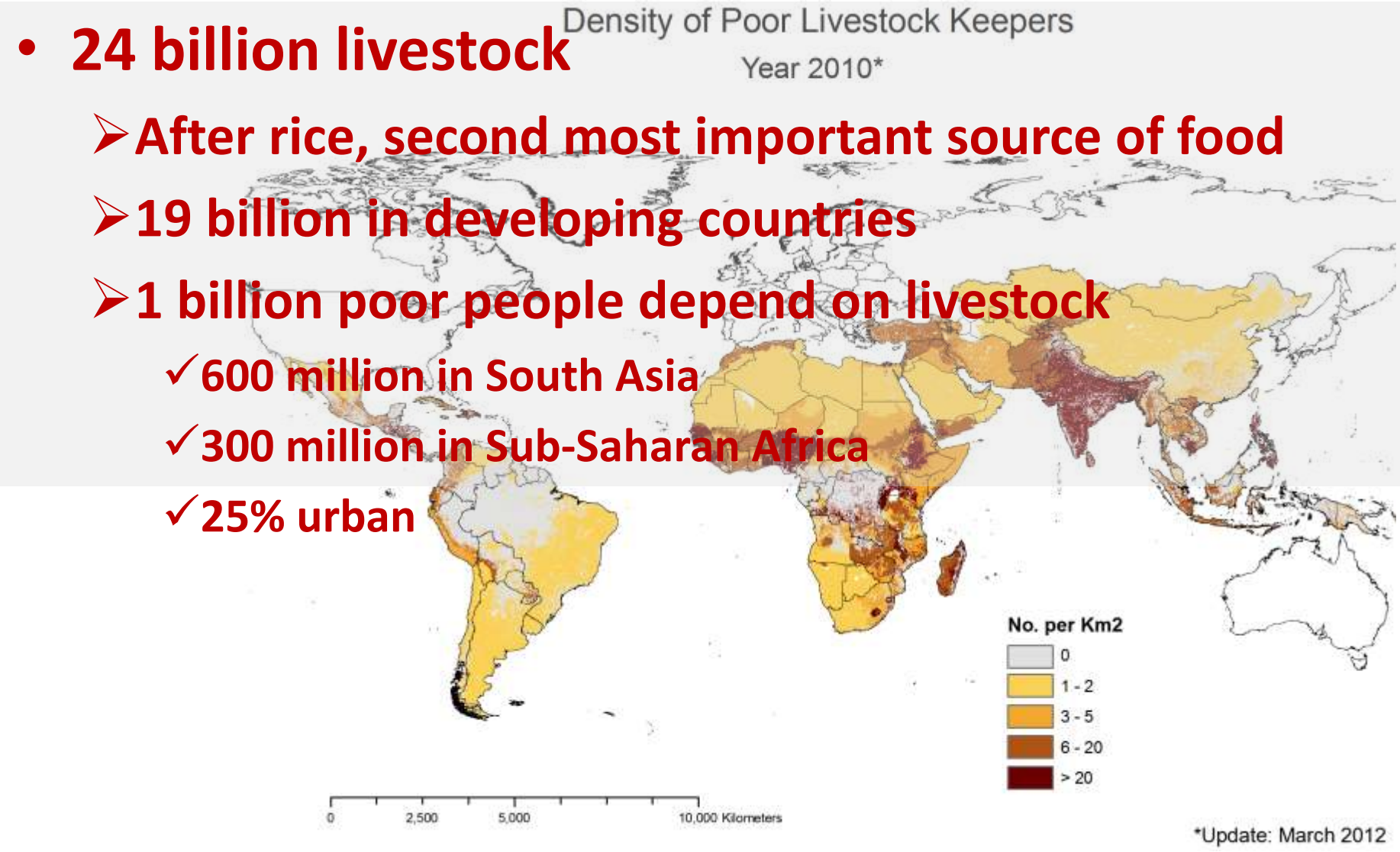
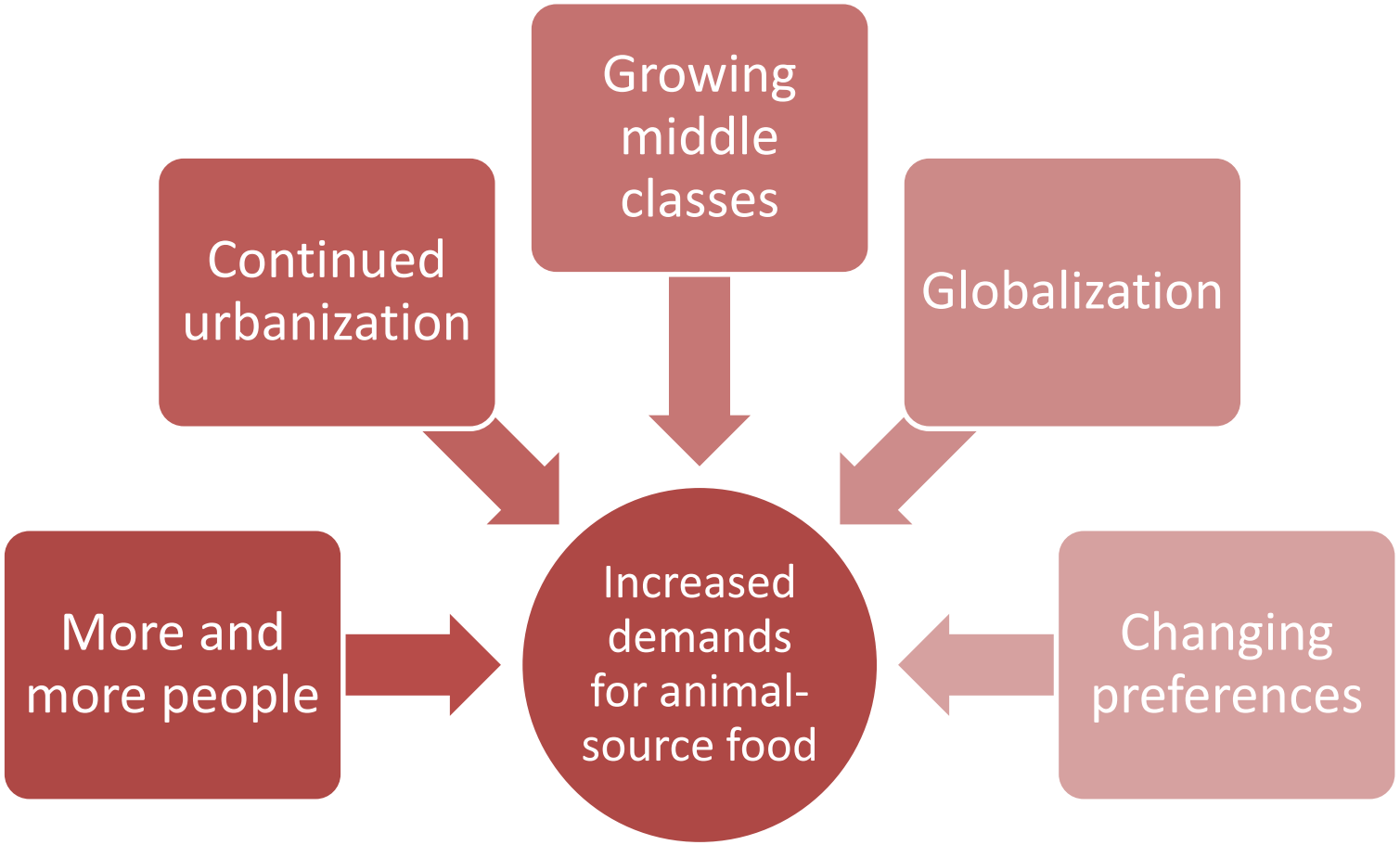
Livestock is important

- **24 billion livestock**
  - ➢ **After rice, second most important source of food**
  - ➢ **19 billion in developing countries**
  - ➢ **1 billion poor people depend on livestock**
    - ✓ **600 million in South Asia**
    - ✓ **300 million in Sub-Saharan Africa**
    - ✓ **25% urban**



Why increasing demands?



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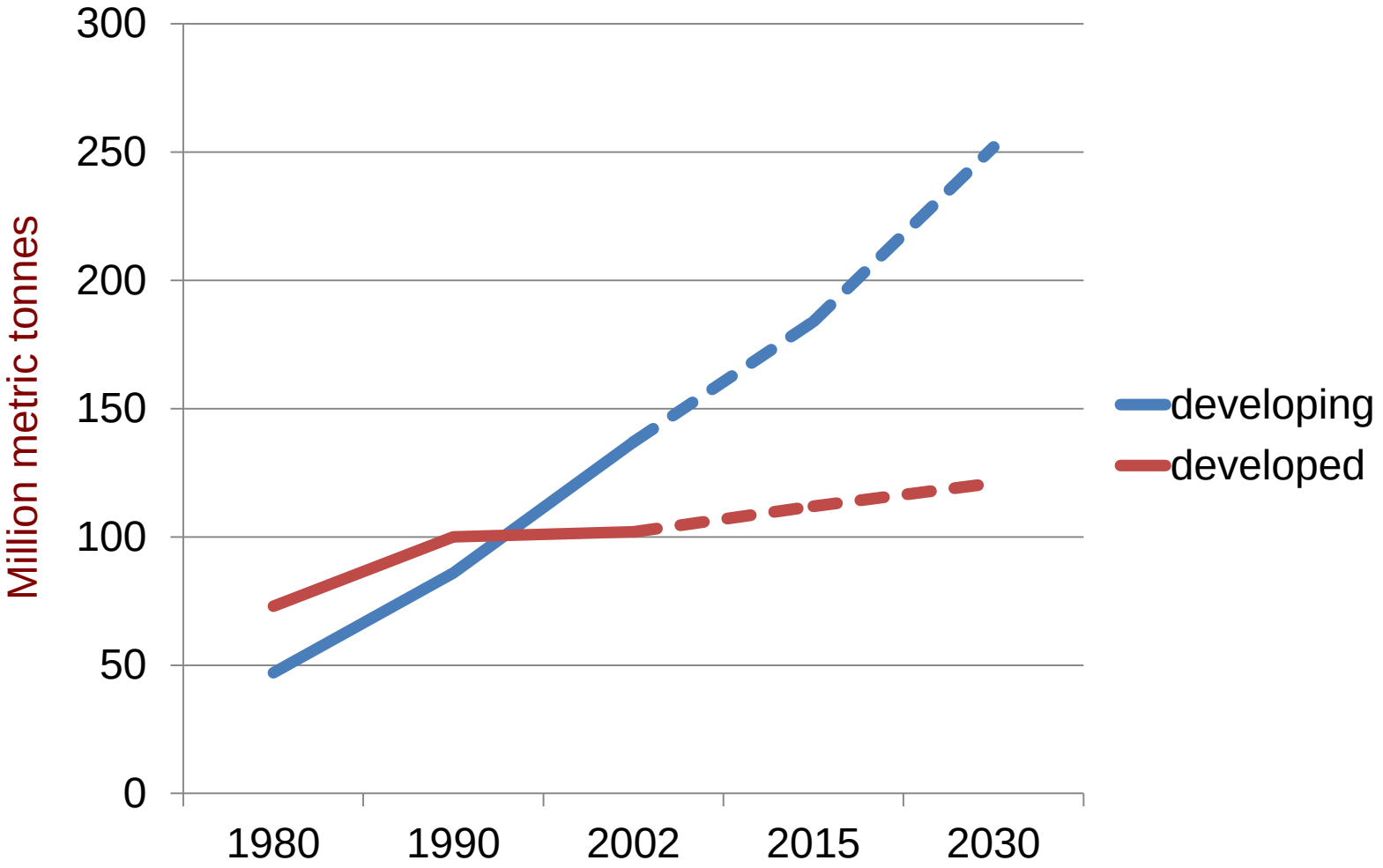
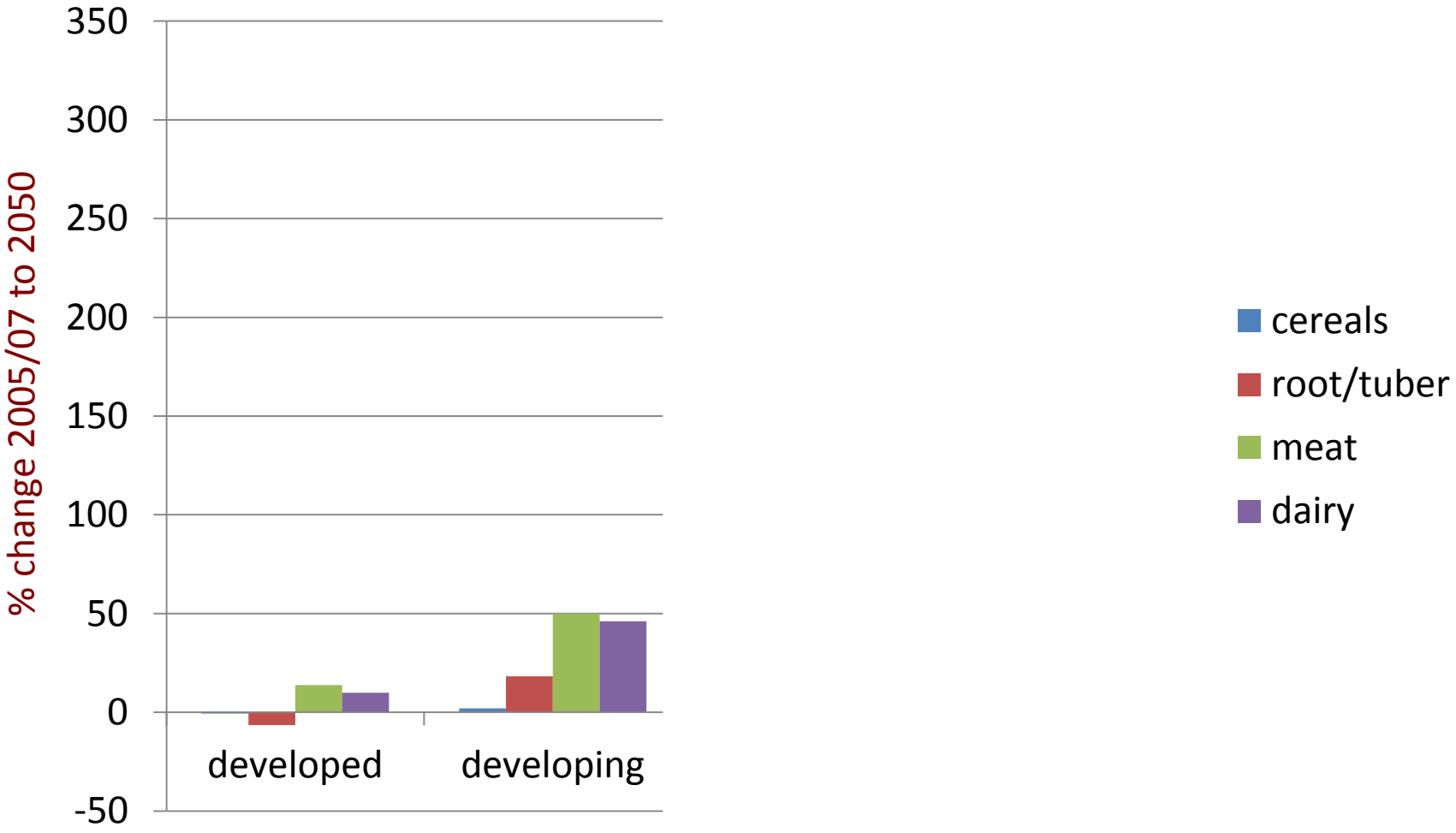
Gains in meat consumption in developing countries are outpacing those of developed



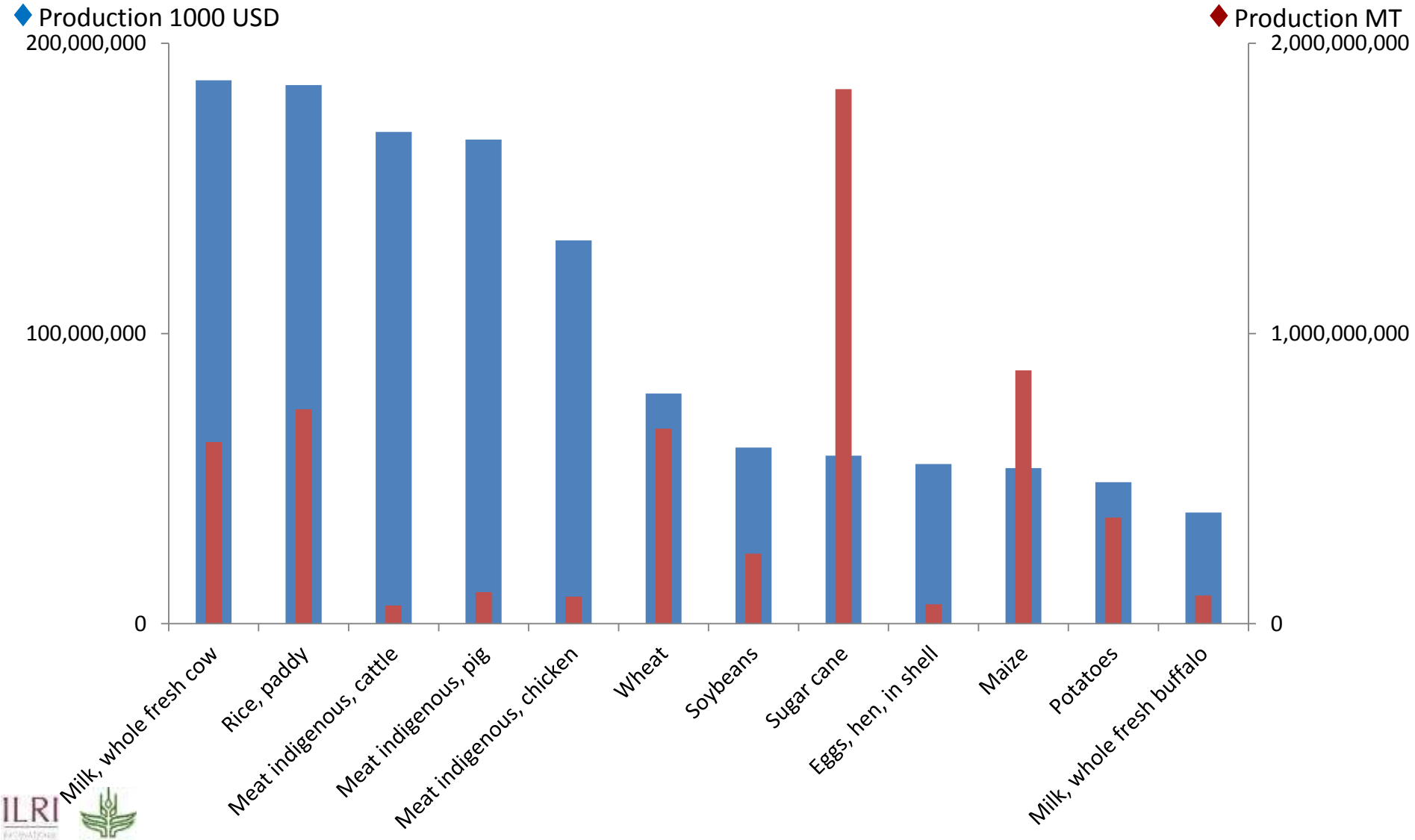
FAO 2006

Change in global and regional demand for food: Livestock and other commodities



Modified from Alexandratos and Bruinsma 2012

FAO statistics 2012



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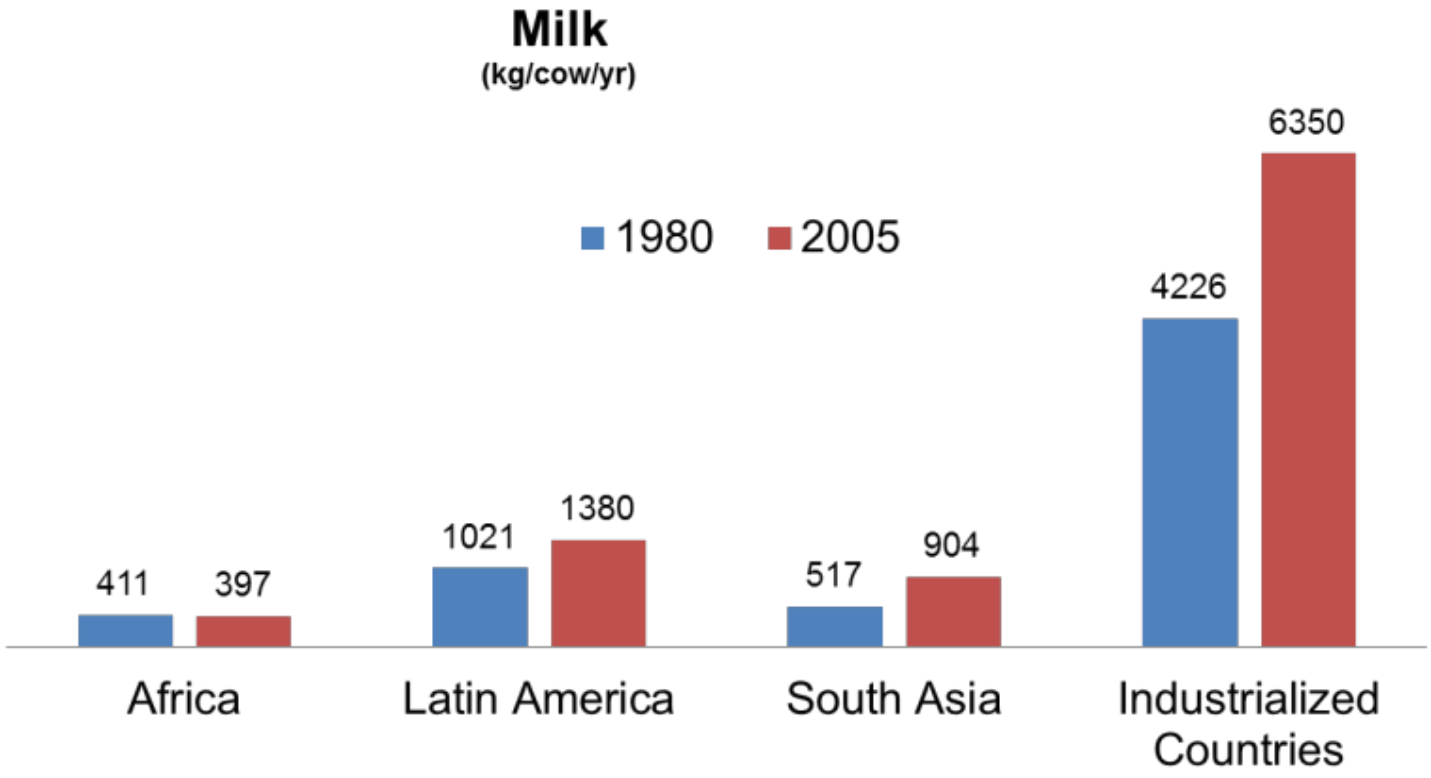
Big productivity gaps -largely due to poor animal health

Some developing country regions have gaps of up to 430% in milk



Steinfeld et al. 2006

Keeping animals….

Keeping animals

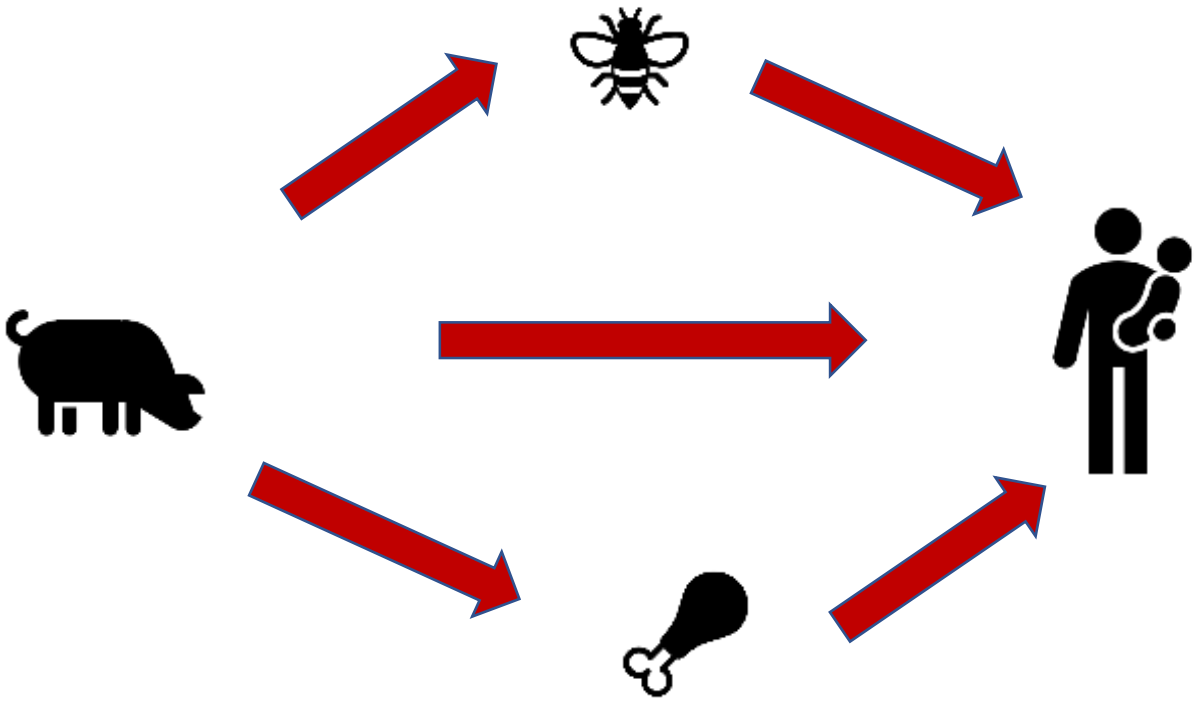
How do people keep livestock, and why is it important?

- Keep it close to home for fear of theft, or because you have to take care of it
- Keep it in the house because no other space
- Keep it scavenging because there is no feed
- Keep it hidden if it is forbidden

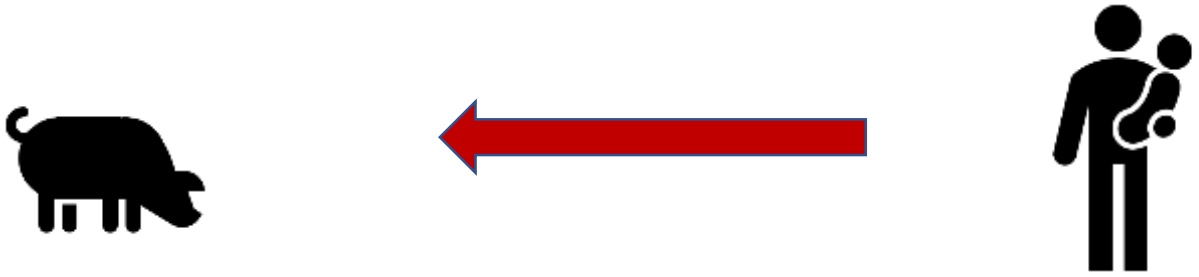
Animals and zoonotic diseases

- Pathogens from animals may be in any excretion
- Many pathogens can infect humans

Zoonoses (Anthropozoonoses)

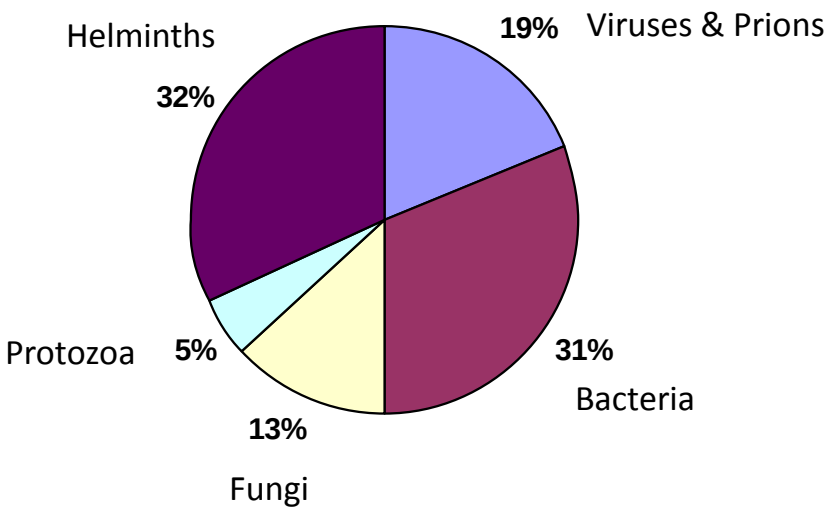


Anthroponosis/ reverse zoonosis (Zooanthroponoses)



Zoonoses in taxonomic units

1415 microbes known to cause disease in humans, **868 (61%) are zoonoses**



Taylor 2001. Risk factors for human disease emergance.
Phil. Trans. R. Soc. Lond. B

Manure and its management

- Manure is a good fertilizer, but also very risky from disease spread of view
  1. Letting it be
  2. Letting it pile up
  3. Biogas/fuel
  4. Sent it away

Foodborne diseases

- Food-borne diseases are very important
- 1.4 million children die every year of diarrhea
- The majority is food and water-associated
- Animal-source food over-represented as a cause

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Food safety issues

- Animal-source food perishable and susceptible
- Bacterial and parasites
- New habits and foods

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Agriculture imposes large burdens on human health

Zoonoses and FBD kill 2.2 million a year

- 2.4 billion people sick
- 2.2 million people dead
- more than 1 in 7 animals affected

Zoonoses & FBD cost $84 billion a year

- $9 billion in lost productivity
- $25 billion in animal mortality
- $50 billion in human health costs

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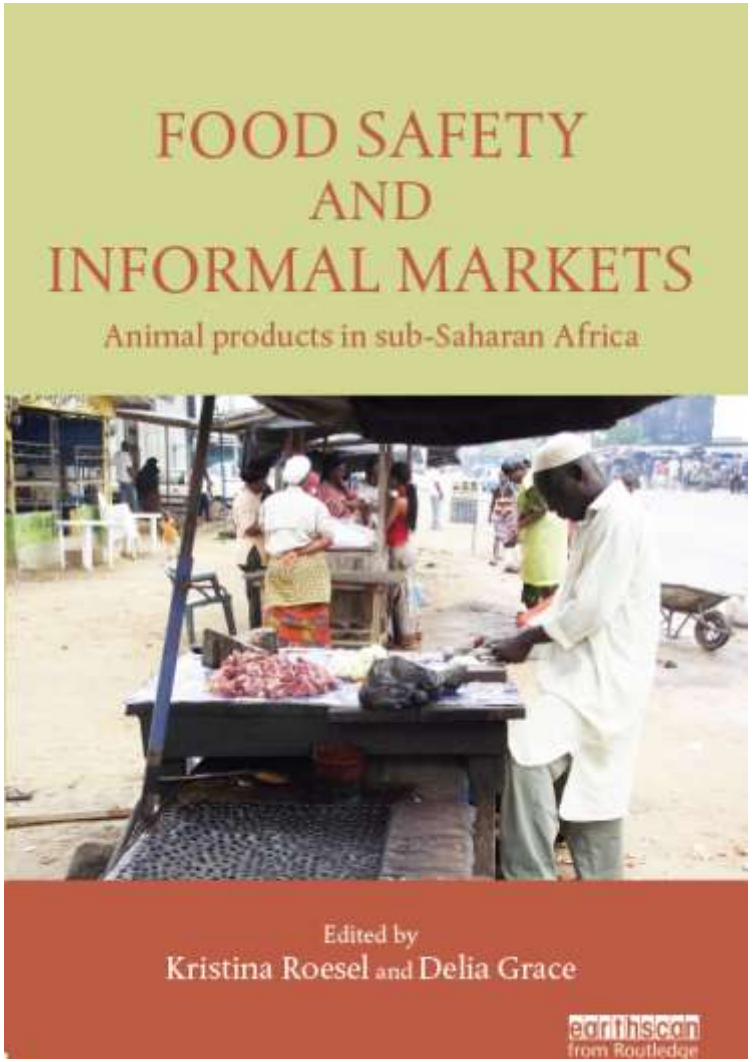
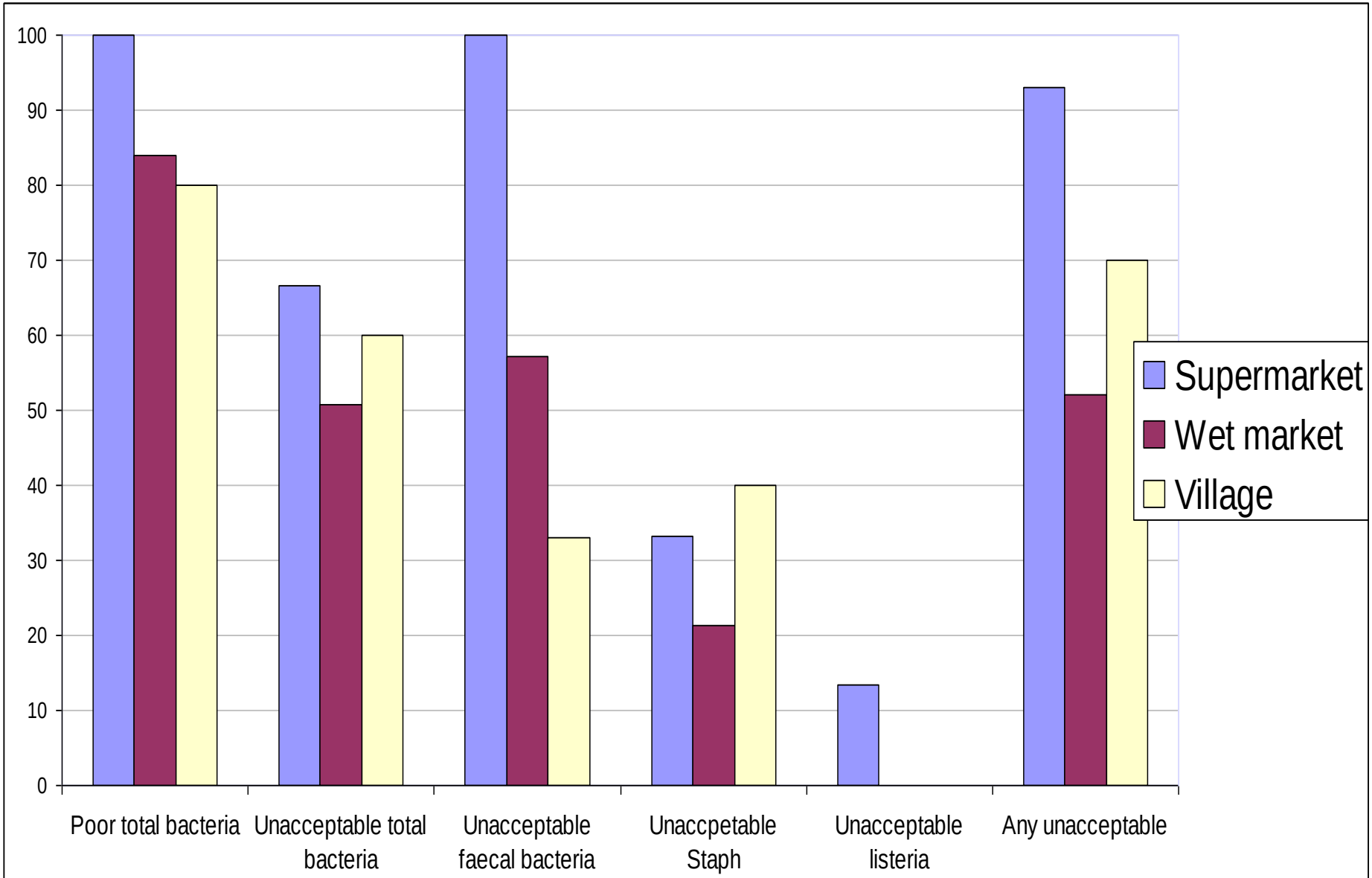
Evidence for food safety

- 90% of animal products are produced and consumed in the same country or region
- 500 million smallholders produce 80% of food in poor countries. 43% of the workforce are women



Compliance : Formal often worse than informal




Homogenised &

Can diseases be transmitted from dung?

	Believe diseases can be transmitted from dung
Producers	
2009	2.7% (11/404)
2012	37.2% (60/161)***
Trained (2012)	69.8% (37/53)***
Untrained (2012)	21.3% (23/108)
Traders	
2009	1.1% (2/175)
2012	47.1% (106/225)***
Trained (2012)	63.9% (78/122)***
Untrained (2012)	27.2% (28/103)

Comparison between 2009 and 2012 survey
Comparison between trained and untrained 2012
Comparison between 2009 and untrained 2012

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Can diseases be transmitted by milk?

	Believe diseases can be transmitted from milk
Producers	
2009	13.0% (52/401)
2012	35.4% (57/161)***
Trained (2012)	64.2% (34/53)***
Untrained (2012)	21.3% (23/108)
Traders	
2009	9.1% (16/175)
2012	41.5% (93/224)***
Trained (2012)	64.8% (79/122)***
Untrained (2012)	13.7% (14/102)

Comparison between 2009 and 2012 survey
Comparison between trained and untrained 2012
Comparison between 2009 and untrained 2012

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In practice

- Traders
  - No difference in if milk was free from dirt (3.5% were not)
  - 82% of trained traders had clean clothes, compared to 50% of untrained ($p<0.001$)
- Producers
  - No difference in the number of milk containers were free from dirt (92% were not)
  - No difference in if milk was free from dirt (2.5% were not)
  - 79% of trained producers had clean clothes, compared to 68% of untrained ($p<0.001$)
  - Significantly higher milk production

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FEED THE FUTURE
The U.S. Government's Global Hunger & Food Security Initiative

Wet markets

Agricultural Sciences

Results

Sample type	N. Specimen	N. positive both *Salmonella* and *S. aureus*	*Salmonella* positive	*S. aureus* positive
Chicken	186	38 (20.4%)	84 (45.2%)	78 (41.9%)
Cuttingboard chicken	62	6 (9.7%)	26 (41.9%)	12 (19.4%)
Cuttingboard pork	62	1 (1.6%)	19 (30.6%)	7 (11.3%)
Pork	186	33 (17.7%)	85 (45.7%)	58 (31.2%)
Grand Total	**496**	**78 (15.7%)**	**214 (43.1%)**	**155 (31.3%)**

Urban inhabitants need food

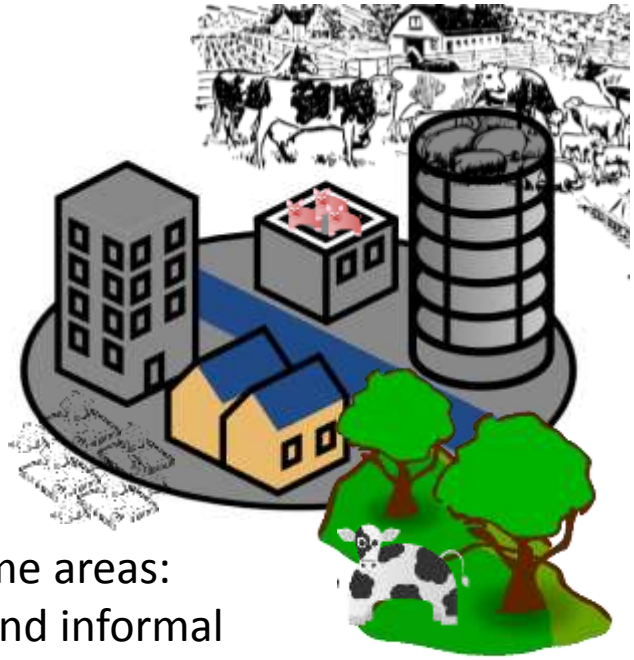
- Large problems to supply from rural areas
- Difficulties with cold chain

Is urbanization important? Why is it a driver of disease?

- 7 billion people
- 50% urban inhabitants – continuous urbanisation
- Urban agriculture involves approximately 800 million people and produces 15-20 % of the food in the world

Urban livestock keeping

Migration from rural to urban:
Farmers bring their animals with them, or they acquire animals in the city since they are used to livestock keeping.



Low-income areas:
In slums and informal settlements the need to grow food and to get extra income makes people acquire animals.

Expansion of cities:
Through areal expansion, rural farms may successively become peri-urban, and then urban.

Public green spaces:
Cultivation and grazing of livestock may occur as a means to increase food security.

The benefits and problems

- Local markets with living and dead animals

The benefits and problems

- Possibility to use urban wastes and waste water
- Lacking sanitation

Conclusions

1. Livestock are important
2. Livestock do contribute to disease spread
3. We need to think of livestock when considering sanitation and hygiene

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